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FRANK SLIDE

The story of what happened early one morning when a town in the Canadian Rockies was caught in the path of one of the largest avalanches in history.

Most of Nature's agents work slowly, so slowly that a thousand years in the shaping of the earth are like the ticking of the second hand on her clock. But she can also gather her forces over a long period and release them suddenly. Then the result is apt to be dismaying as it was when the peaceful village of Frank, Alberta, was caught in the path of one of the largest landslides of history. While most of the village slept, a mass of rock weighing 90 million tons, as much as 2000 of the heaviest battleships afloat, crashed down upon it, covering a distance of two and one-half miles at an estimated speed of 90 miles per hour.

Late in the evening of April 28, 1903, Chapman, one of the nineteen men on the night shift of the Frank Coal Mine, paused before entering the tunnel. He looked around into the quiet valley of the Old Man River and up the steep slope to the crest of Turtle Mountain towering nearly 3000 feet directly above. The many vertical limestone cliffs seemed almost to overhang the mine entrance.

MacKenzie joined him and suggested that they go into the mine. It was too cold to stay outside. A few days before the weather had been unseasonably warm. In Calgary the temperature had risen to 74 degrees. The roaring waters of Old Man River in the valley below

gave eloquent testimony that a great amount of snow had melted from the mountain. But tonight it was cold enough in all conscience. The thermometer might fall to zero before morning.

King Frost was preparing to take over the night shift in Turtle Mountain and on a scale out of all proportion to the human crew in the mine.

Chapman hesitated before going below,--for seven months there had been slight earth shocks in the mine, like the shuddering of a ship struck by a great wave. Deep in the tunnel there seemed to be a general squeeze in the ground. The timbers appeared to be under an excessive strain. Rockfalls in the mine chambers were increasingly frequent. The coal had begun "to mine itself". Some of the men had become worried and had gone on up to Blairmore to work.

Most of the lights in the town of Frank had died out and cold darkness was settling over the valley when Chapman entered the mine. The Section where the night crew were working on the 28th was a chamber where the roof was no more than 300 feet below the surface.

At four o'clock in the morning an engineer backed his freight engine up to the tipple at the mouth of the mine for a load of coal. The load that Turtle Mountain had in readiness for him was not a few cars of coal but a mass of limestone a half a mile square and 400 or 500 feet thick in the center. The engineer was startled by a sharp noise on the mountain. Instinctively he immediately threw his throttle to full speed ahead. In that

instant he saw the wole side of the mountain tear loose with a roar like steam escaping under high pressure.

His train ran clear, but looking back he was horrified to see the men who were working at the entrance of the mine overtaken and buried by the slide. The avalandhe roared down into the valley, wiping out the south east of the town. So fast was its rush that broken into innumerable fragments, the mass plowed through the bed of Old Man River carrying both water and river bottom with it and hurled itself up the opposite side of the valley to a height of 400 feet.

Down in the town, Mr. McLean, who kept a boarding house, happened to be up. He heard the noise and rushed to the door in time to see the slide shoot past him only a few feet away. The avalanche was so instantaneous that he thought that an eruption had blown out the base of the mountain directly in front of him.

A Mr. Warrington, who was sleeping in one of the cottages destroyed, was awakened by a noise which he thought to be caused by hail. Realizing that it might be something more serious, he jumped from bed. The house began to shake, and the next thing he knew he was 40 feet from where the house had stood, his bed some 20 feet farther on. His thigh was broken and he was otherwise injured, but he lived as one of the few persons ever to have survived actual contact with a giant avalanche.

The people of the remaining part of the town rallied at once to the rescue. But from the entire eastern section, where fully 70 persons had been living, there

were less than half a dozen survivors.

What of the men in the mine--Chapman, MacKenzie, Chestnut, Morris--nineteen in all? Where the tipple had stood there was now a mass of broken rock at least 50 feet thick. Poor fellows, they had either been smashed in their chamber beneath the millions of tons of rock or were hopelessly trapped beneath it. It seemed impossible even to recover their bodies in the rock wilderness.

Three hundred feet below the surface, the first signs the miners had had that anything was wrong was a great blast of air through their tunnel. It blew all the trap and safety doors open and threw men and horses off their feet. The mouth of the tunnel was at once blocked by broken rock.

Deeper in the mine, coal suddenly started to break loose and shower down the manways. The men working nearby became frightened and heard a scream of agony and looked up to see MacKenzie caught in a cross-passage which was partly sealed by crushed and fallen rock. Though lacking tools, Chapman sprang into the danger zone and with his bare hands tore the rocks from MacKenzie and carried him to the tunnel below. All the way down he was battered by falling coal but was saved from serious injury by his miner's helmet.

The tunnel entrance was completely blocked, and the lower tunnel was full of sulphurous water. Chestnut volunteered to try to escape through one of the airways, but soon returned with the news that bad gas

pockets were forming there--the airways had also been closed by the slide. They tried to estimate from this how thick the avalanches must be above their heads. Should they attempt to dig out through the debris over the tunnel,or try to drive a shaft to the surface farther back in the mine where the surface slope was deeper and the avalanche probably less thick?

After some discussion it was decided to attempt the latter. But the tools were at the other end of the tunnel, a mile from the entrance. Volunteers agreed to attempt the hazardous passage back through the tunnel braving the falling rocks, to secure these tools and some necessary timbers. Four thousand feet from the entrance, the upper wall of a large chamber had been crushed in almost eighteen feet, and they had difficulty getting around the obstruction to the tools. It was almost seven in the morning when they returned, and the way the rocks had been settling convinced them it would not be possible to go back for more equipment.

All morning and into the afternoon the men worked in shifts working the shaft towards the surface and timbering it with logs removed from the tunnel. Gas began to collect in the upraise, but driven on by desperation they persisted until about five in the afternoon, when they suddenly broke through--to be greeted with a shower of rocks. Luckily all but one of the men escaped this new danger, and he was not seriously injured. The rock fragments fell for only a few minutes, and cautious investigation showed that the way was open to the sur-

face. They came out almost on Dominion street, the main thoroughfare of Frank.

Once above ground, Chapman looked up at the mountain. Its eastern face was entirely different from when he last saw it, and the valley he had known so well was now a chaos of rock fragments. He did not realize it, but he was looking at the largest known rockslide that had occurred on this continent and one of the largest that had occurred in historical time. It covered over one square mile and had an average depth of about 65 feet.

What caused this great mass to break loose from the mountain? And why had it fallen at this time? The answer to the first question can be found in the structure of the mountain itself. Turtle Mountain is composed of a relatively soft Cretaceous sandstone and shale, with some rather thick seams of soft coal. The slope of the upper part of the mountain averages over 45 degrees, and in the part which broke away, it may even have reached 75 degrees. This great mass of limestone is cut by an extensive series of joint crack, developed at right angles to the bedding. The cracks dip towards the valley at a much lower angle than does the slope of the mountain itself, forming great wedge-shaped blocks, which if broken loose will slide into the valley.

Several cuases combined to precipitate the avalanche on April 29th, 1903. The mine was right at the foot of the mountain, and in the light of the rockfalls and earth shocks which the miners had been noticing for over a period of seven months, it seems certain that the

soft Cretaceous sediments were settling and giving under the weight of the mass of the mountain. It is probable that the shocks were communicated to the limestone mass itself and served to break open the joints which weakened it.

But the unseasonable weather determined the hour at which the calamity occurred. The unusual warmth of the past few days caused extensive melting of the winter snows, and this melted water had penetrated the open joint cracks. Then on the 28th there was a sharp change to cold weather, and the thermometer fell to zero in Frank on the morning of the slide. The water in the joint cracks froze. As it froze it expanded, tearing loose the last supports which held the mass in place, freeing it to hurtle down into the valley as one great avalanche of destruction.

Easily reached, since it lies in Crow's Nest Pass, which is one of the most travelled east-west routes through the Rocky Mountains of Canada, the Frank Slide is one of the most remarkable geologic phenomena that the writer has seen. Some of the accompanying photographs, taken in 1939, show the slide as it appears today. The rocks look so freshly broken that it is hard to believe that this disaster occurred almost 41 years ago.

People still live in the town of Frank, though the structure and disposition of Turtle Mountain are the same as before. A geologic examination of the mountain in 191.. showed that new fissures were developing behind the steep slope. One cannot say it won't happen again. You

drive across the chaos of broken rocks, and a feeling of apprehension comes over you. You glance warily up at the mountain. Sometimes when you look, a rock will fall from the cliff and come tumbling down. You look and you wonder whether Nature is spending her energies in her slow, normal way, or whether she is gathering them for another gigantic cataclysm.

(Magazine Excerpt)